Technical Working Session on 25 June 2015

Discussed and agreed on:

(1) Overall context and guidance for formulation of sub-scenario development
(2) Approach, methodology and proposed for sub-scenarios development
(3) Data requirements and handling data gaps
(4) Detailed schedule
Scenario Formulation and Development

- Access data on existing & planned irrigation schemes
- Map planned and existing irrigation projects throughout the basin with basic info on each project (i.e., extent, basic use & season, intake point)
- Describe selected irrigation development projects. Indicate general parameters including extent of development, crops, impact on land conversion, infrastructure including parameters of headworks & weirs

Scenario Formulation and Development (continued)

- Estimate water intake & return flows for each project & development time-step estimates
- Identify baseline, trends and potential of groundwater use for irrigation and its impact on downstream hydrology
- Estimate fertilizer & pesticide use & develop time-step estimates (weekly or daily) of pesticide & nutrient loading/run-off
Scenarios Timeline

**Early Development Scenario:**
Current Situation – Baseline

**Definite Future Scenario:**
Projects expected to be in place in 2020 currently under development or firmly committed

**Planned Development Scenario:**
Adds all the planned Projects under consideration

**Exploratory Scenarios**
Tests of development opportunities

Only for the cumulative assessment

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**Purpose of the Scenarios**

- **Early Development Scenario (2007):**
  - The main purpose of this scenario is to assess the distribution of the benefits, costs, impacts and risks of water resources development in the Mekong Basin as of 2007.

- **Definite Future Scenario (2020):**
  - The main purpose of this scenario is to assess the distribution of the benefits, costs, impacts and risks of water resources development in the Mekong Basin as predicted in 2020.

- **Planned Development Scenario (2040):**
  - The main purpose of this scenario is to assess the distribution of the benefits, costs, impacts and risks of water resources development in the Mekong Basin as of 2040.
  - On a timescale, the scenario covers the water resources development that would be in place by 2040 assuming these plans are fully implemented.
Sub-Scenarios Formulation

- 3 sub scenarios needs to be formulated for the 2040 horizon:
  - A minimum expected development (MIND),
  - A ‘Most Likely’ expected development (MLD) and,
  - A maximum expected development (MAXD).

The 3 sub scenarios should provide variations that bound the Planned Development Scenario.

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Sub-Scenarios Formulation

- The minimum expected development (MIND), corresponds to a scenario where only a very limited development of the irrigation sector will occur respect to the Planned Development Scenario.

- The ‘Most Likely’ expected development (MLD), corresponds to what most possibly will occur in 2040.

- The maximum expected development (MAXD), corresponds to the maximum extension of the irrigation development in the LMB for each country.
Concept of the Irrigation Process

- The Irrigation process combines different inputs associated timely and spatially over a land area to provide an output.
- The Inputs are (but not limited to):
  - Water resources
  - Agricultural Inputs (Seeds, Fertilizer, Pesticides, etc)
  - Energy
  - Capital Investments (Infrastructures, Land, etc)
  - Machinery and Manpower
- The Outputs are (but not limited to):
  - Water (Infiltration, return flow, etc)
  - Crop Production with its value
  - Employment (direct and indirect)
- But also other positive and impacts (Ecologic and Physical Services, Pollution, etc)

Irrigation Development: Sub Scenarios

Which drivers should be considered?

- The Irrigation process involves a multiplicity of factors that influence the potential development the sector may have.
- To evidence different sub scenarios, we look at some specific drivers that will allow to difference the development.
- The delineation of the sub scenarios is guided by the following drivers that will influence the development:
  - The Investment Plan and Policy on Irrigation Infrastructure
  - The Improvement on Water Use Efficiency
Irrigation Development: Sub Scenarios
Which drivers should be considered?

1- INFRASTRUCTURES

- The level of Investment in the Infrastructure development or rehabilitation will differentiate the path of the irrigated areas increment
- Investment can focus on canals, reservoirs, headworks, etc
- With a low, medium or High level of investment, the Area Increment will variate

2- WATER USE Efficiency

- The level of Investment in the Water use Efficiency will differentiate the path of the irrigated areas increment
- The direct effects of the investment can be measured on the Supply / Demand pattern and on the return flow
- Investment can focus on the Water Management infrastructures, on water Policies, on farm Irrigation, on community development etc
1. On the basis of the data collected for each country, we draft three scenarios that are differentiated by an increment of the irrigation area.

2. At the basin level, the total irrigated area for each scenario is a sum of rehabilitation projects and new creation projects. Of course this varies from one country to the other.

3. In addition, the application of the policy on the efficient use of water will vary in each scenario.

4. Finally, the Outputs of each scenario will differ and will be studied through indicators that shall reflect the differences in terms of:
   a) Irrigated Area
   b) Cropped Area
   c) Production
   d) Water Productivity
   e) Water Demand / Supply / Return flow
The minimum expected development (MIND)

- Combination of a low level of investment with a limited improvement of water use efficiency.
- Priority will be given for the investment policies on the scheme rehabilitation rather than on the creation of new ones.
- Spatial differences occurring in the priority of the investment shall be indicated by the MCs.

The ‘Most Likely’ expected development (MLD)

- Combination of a medium level of investment with a medium improvement of water use efficiency.
- The share of the investment between the creation and the rehabilitation, together with the spatial distribution would be balanced.
The Maximum expected development (MAXD).

• This scenario would combine a high level of investment with a high improvement of water use efficiency.

<table>
<thead>
<tr>
<th>DEVELOPMENT</th>
<th>Data Requirement</th>
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<tbody>
<tr>
<td>• Areas equipped for irrigation (ha)</td>
<td>• Areas equipped for irrigation (ha)</td>
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<tr>
<td>• Wet, dry and 3\textsuperscript{rd} season irrigated areas (ha)</td>
<td>• Wet, dry and 3\textsuperscript{rd} season irrigated areas (ha)</td>
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<td>• Non-rice crop area (ha)</td>
<td>• Non-rice crop area (ha)</td>
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<td>WATER</td>
<td>WATER</td>
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<tr>
<td>• Cropping calendars</td>
<td>• Cropping calendars</td>
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<tr>
<td>• Evapotranspiration data (mm) by project and timestep</td>
<td>• Evapotranspiration data (mm) by project and timestep</td>
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<tr>
<td>• Gross irrigation water Requirement (Rice and Non rice) (m\textsuperscript{3}/ha) by project and timestep</td>
<td>• Gross irrigation water Requirement (Rice and Non rice) (m\textsuperscript{3}/ha) by project and timestep</td>
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<tr>
<td>• Return Flow and location (m\textsuperscript{3}/ha) by project and timestep</td>
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<td>INFRASTRUCTURE</td>
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<td>• Irrigation Method and On-farm efficiency (%)</td>
<td>• Irrigation Method and On-farm efficiency (%)</td>
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<td>• Conveyance, On Farm and Overall Efficiency (%)</td>
<td>• Conveyance, On Farm and Overall Efficiency (%)</td>
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<tr>
<td>• Cost for Conveyance Infrastructure (USD/Ha)</td>
<td>• Cost for Conveyance Infrastructure (USD/Ha)</td>
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<td>• Cost for On Farm Infrastructure (USD/Ha)</td>
<td>• Cost for On Farm Infrastructure (USD/Ha)</td>
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<td>• O&amp;M Cost per Year (USD/Ha/Year)</td>
<td>• O&amp;M Cost per Year (USD/Ha/Year)</td>
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<td>• Energy Cost per Year (USD/kWh/Year)</td>
<td>• Energy Cost per Year (USD/kWh/Year)</td>
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<td>CROP</td>
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<tr>
<td>• Crop Production (t)</td>
<td>• Crop Production (t)</td>
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<td>• Production Value (USD)</td>
<td>• Production Value (USD)</td>
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<td>• Crop Production Cost (USD/ ha)</td>
<td>• Crop Production Cost (USD/ ha)</td>
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<td>• Crop Intensity (%) by project</td>
<td>• Crop Intensity (%) by project</td>
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<td>• Mechanization level (units to be determined)</td>
<td>• Mechanization level (units to be determined)</td>
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<tr>
<td>ENVIRONMENT</td>
<td>ENVIRONMENT</td>
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<tr>
<td>• Erosion load (t/Ha) by project and timestep</td>
<td>• Erosion load (t/Ha) by project and timestep</td>
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<tr>
<td>• Return flow water quality (units to be determined)</td>
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FOR EACH PROJECT FOR EACH TIME HORIZON
DATA COLLECTION

- Existing data at the MRC
  - AIP 2004 database (Old)
  - BDP2 database (Old)
  - Relevant literature and documents
- Irrigation Database (AIP Activity #1.4.1) – Ongoing
  - Laos, Thailand and Vietnam: submitted draft of irrigation database
  - Cambodia did not implement (Cambodian national consultants are working under CS)
  - Database has been checked in their consistency with their reports and need to be finalized
- Data Collection Forms to be compiled
  - Feedback from the NC
- External data
  - Internet
  - Scientific Literature
  - Other sources: AFD – ADB – WB – FAO – JICA - CGIAR

WORK PLAN - General
**WORK PLAN - Details**

<table>
<thead>
<tr>
<th>Task Description</th>
<th>Start</th>
<th>End</th>
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<tr>
<td><strong>SCENARIO DEVELOPMENT</strong></td>
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<tr>
<td>Data Collection</td>
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<tr>
<td>Forms Compilation</td>
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<td>22/07/15</td>
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<td>Irrigation Database Finalization</td>
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<td>Literature Review</td>
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<td>National Consultations</td>
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<td>Scenario Finalization</td>
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<td>Data Gaps Handling</td>
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<tr>
<td>Scenario Approval prior to assessment</td>
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<td>23/09/15</td>
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**Work Plan for Scenario Development:**
Thank you